**DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Office of Structural Materials
Quality Assurance and Source Inspection

Bay Area Branch
690 Walnut Ave.St. 150
Vallejo, CA 94592-1133
(707) 649-5453
(707) 649-5493

Contract #: 04-0120F4
Cty: SF/ALA Rte: 80 PM: 13.2/13.9
File #: 70.28

# WELDING INSPECTION REPORT

**Resident Engineer:** Pursell, Gary
**Address:** 333 Burma Road
**City:** Oakland, CA 94607

**Report No:** WIR-002802
**Date Inspected:** 04-Jun-2008

**Project Name:** SAS Superstructure
**Prime Contractor:** American Bridge/Fluor Enterprises, a JV
**Contractor:** Japan Steel Works

**OSM Arrival Time:** 800
**OSM Departure Time:** 1830
**Location:** Muroran, Japan

**CWI Name:** Chung-Fu Kuan

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|---|---|---|---|---|---|
| **Inspected CWI report:** | ☑ Yes | ☐ No | ☐ N/A | **CWI Present:** | ☑ Yes ☐ No |
| **Electrode to specification:** | ☑ Yes | ☐ No | ☐ N/A | **Rod Oven in Use:** | ☑ Yes ☐ No ☐ N/A |
| **Qualified Welders:** | ☑ Yes | ☐ No | ☐ N/A | **Weld Procedures Followed:** | ☑ Yes ☐ No ☐ N/A |
| **Approved Drawings:** | ☑ Yes | ☐ No | ☐ N/A | **Verified Joint Fit-up:** | ☑ Yes ☐ No ☐ N/A |
| | | | | **Approved WPS:** | ☑ Yes ☐ No ☐ N/A |
| | | | | **Delayed / Cancelled:** | ☐ Yes ☑ No ☐ N/A |

**Bridge No:** 34-0006
**Component:** Tower, Jacking and Deviation Saddles

**Summary of Items Observed:**

The following report is based on METS observations at Japan Steel Works (JSW) in Muroran Japan. Current work: Casting, machining and nondestructive testing of Saddles.

Fabrication Shop 4

On this date the Caltrans Quality Assurance (QA) inspector, Joe Lanz arrived at JSW fabrication shop number 4 and observed the in process assembly fit-up operation of the structural steel plates for the West Deviation Saddle grillage W2E2. The JSW fitter personnel Kiyotaka Koanagi continued assembly by aligning the rib plates, piece marks 2-15 and 2-16 on the base plate, piece mark 2-3, joint designations E2Y-13L and E2Y-14L and aligning with the stem plate, piece mark 2-2, joint designations E2Y-13V and E2Y-14V. The JSW welding personnel Yoshihiro Ohta, identified as number 08-2017 performed the in process tack welding utilizing the Shielded Metal Arc Welding (SMAW) process per the welding procedure specification (WPS) SJ-3011-2 and SJ-3011-3. The welding was performed in the 2G (Horizontal) and 3G (Vertical) positions. The filler metal utilized was identified as 4.0mm and 4.8mm diameter, Class E9018-M-H4R, Brand name Hoballoy 9018-M. The welding parameters and heat control were monitored by Intertek Testing Services Quality Control (QC) inspector Mr. Chung-Fu Kuan at periodic intervals. During tacking of the lower tack weld between the rib plate 2-15 to the stem, the QA inspector observed the preheat temperature measured on the opposite face of the stem plate, 100mm from the weld to be less that the required 160° Celsius per the WPS SJ-3011-3. This issue was brought to the attention of the QC inspector, Mr. Kuan. The actual temperature, as measured by Mr. Kuan, at 100mm from the weld zone was 120° Celsius. AWS D1.5-2002 paragraph 4.2.7 states “When the base metal is below the temperature listed for the welding process being used and the thickness of material being welded, it shall be preheated (except as otherwise

provided) in such a manner that the steel on which weld metal is being deposited is at or above the specified minimum temperature for a distance equal to the thickness of the part being welded, but not less than 75 mm [3 in. ] in all directions from the point of welding." This issue was brought to the attention of Caltrans Structural Materials Representative Mr. Ron Brasel, who issued a non-conformance report. The SMAW welding average amperage and voltage by clamp type meter and travel speed were verified to be within the welding procedure specification parameter range of 245 amps to 270 amps, 22 volts to 25 volts and travel speed of 132 to 168 mm per minute for the 4.8mm electrode and 145 amps to 165 amps, 21 volts to 24 volts and travel speed of 72 to 97 mm per minute for the 4.0mm electrode by the QA inspector. The work was not completed on this date and does not appear to meet the minimum requirements of the welding procedure specification and contract documents.

Foundry

On this date the QA representative Joe Lanz traveled to JSW foundry to monitor the in process casting repair welding on West Deviation Saddle casting W2E1. The welding was performed to build up the thickness of the ribs in areas that were found to not meet the minimum thickness of the contract special provisions. The repair locations and repair details for this casting were submitted as number 000643, revision 02. The JSW welding personnel Mr. H. Sato, identified as number 69-2697 continued the in process repair welding of Rib 7L, repair 2-6, location C-1 utilizing the Shielded Metal Arc Welding (SMAW) process per the welding procedure specification (WPS) SJ 3026-2. The welding was performed in the 2G (Horizontal) position. The filler metal utilized was identified as 4.8 mm diameter, Class E10016-G, Brand name LB-106. The minimum preheat temperature of 150 degrees Celsius and maximum interpass temperature of 260 degrees Celsius was verified to meet the WPS requirements by the QA inspector utilizing Tempilstik temperature indicators. The SMAW welding average amperage and voltage by clamp type meter and travel speed were verified to be within the welding procedure specification parameter range of 180 amps to 240 amps, 22 volts to 26 volts and travel speed of 115 to 280 mm per minute by the QA inspector. The repair on rib 7L, number 2-6 length is 550 mm, width is 70 mm and maximum depth is 2 mm with an area of 56 square centimeters. The work was not completed on this date and appears to meet the minimum requirements of the welding procedure specification and contract documents.

| Item | Weld Identification | Applicable WPS | CWI Name | Amperage | Voltage | TravelSpeed | Preheat Temp | Remarks |
|---|---|---|---|---|---|---|---|---|
| 1 | W2E2, E2Y-16L | SJ-3011-2 | C. Kuan | 250 AC | 24.0 AC | 150 mm/min. | 160° C | Y. Ohta |
| 2 | W2E2, E2Y-15V | SJ-3011-3 | C. Kuan | 150 AC | 22.5 AC | 70 mm/min. | 120° C | Y. Ohta |
| 3 | W2E1, 7L | SJ-3026-2 | N/A, ASME | 210 AC | 23 AC | 200 mm/min. | 180° C | H. Sato |

**Summary of Conversations:**

There were general conversations with Japan Steel Works, Ltd. representative Mr. Kunio Nagaya and Intertek Testing Services Certified Welding Inspectors Mr. Chung-Fu Kuan relative to the location of the welding and inspection personnel in the fabrication shop number 4 and as noted above.

**Comments**

This report is for the purpose of determining conformance with the contract documents and is not for the purpose of making repair or fit for purpose recommendations. Should you require recommendations concerning repairs or remedial efforts please contact Venkatesh Iyer, (858) 967-6363, who represents the Office of Structural Materials for your project.

# WELDING INSPECTION REPORT

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|---|---|---|
| **Inspected By:** | Lanz,Joe | Quality Assurance Inspector |
| **Reviewed By:** | Brasel,Ron | QA Reviewer |